

Application No.:09/761,514
Amendment dated: July 6, 2004
Reply to Office Action of April 5, 2004

b.) Remarks

Claims 1 through 48 remain pending in this application. New claims 49 and 50 have been added.

Applicants thank Examiner for the withdrawal of the 35 U.S.C. § 112, second paragraph, rejections.

Applicants also thank Examiner for the courtesy of the access to the translation of DE 198 05 849.

Turning now to the prior art rejections, some background concerning optical alignment may be helpful.

In the past, there has been generally two forms of optical alignment: passive and active.

In passive alignment, mechanical registration features are typically provided on the optical bench so that, when installed on the bench, the optical component will have adequate alignment. Typically, this is the least expensive form of alignment but micrometer precision alignment is difficult to achieve repeatably.

In active alignment, the optical components are typically installed on the bench. Then, they are deformed or otherwise moved in response to an optical signal that is transmitted through the optical train to maximize the train's performance. This approach is precise, but expensive.

The present invention is similar to the passive approach in some ways: positions of the optical components of the optical train are measured, such as with a metrology system. But, the invention is also similar to the active approach because then the optical components of the optical train are aligned in response to the determined positions.

Application No.:09/761,514
Amendment dated: July 6, 2004
Reply to Office Action of April 5, 2004

In short the preferred embodiment uses passive metrology characterization of the train followed by plastic deformation alignment as used on active alignment processes, but without the need to transmit a signal through the optical train.

Claims 1-48 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Pat. No. 6,207,950 to Verdiell. This rejection is respectfully traversed for the following reasons.

Claims 1 and 29, for example, require installing optical components on an optical bench, followed by measuring the positions of the optical components, and aligning the optical components in response to those positions.

This sequence of operation is not shown by the Verdiell patent. The Verdiell patent is directed to a conventional active alignment system. Specifically as shown in Figs. 3A-3C, after the optical train including the chip 18, ball lens 16, and optical fiber 22 are attached to the bench, the flexures 29 are then bent using the positioner 52. This is a conventional active alignment system in which the flexures are deformed to maximize the coupling into the fiber.

In contradistinction, claims 1 and 29, for example, require measuring the positions of the optical components, and then aligning the optical components in response to these measured positions. This corresponds to a passive alignment process. In short, the Verdiell patent does not measure the positions of the optical components. Instead, it deforms the flexures in an active alignment process.

The maintenance of this rejection seems to be based on a disagreement as to whether the claim requires a sequence. Claim 1 requires a sequence in that the claim includes measuring positions of the optical components of the optical train, which had been installed in the previous step, and aligning the optical components of the optical train in response to the positions, which were determined in the previous step. Thus ordering is implicit. Nonetheless, new claims 49 and 50 have been added.

Application No.:09/761,514
Amendment dated: July 6, 2004
Reply to Office Action of April 5, 2004

Claims 1-48 were rejected under 35 U.S.C. § 103(a) as being unpatentable over German Application DE 198 05 849. This rejection is respectfully traversed.

Claim 1 and 29 require the installation, followed by measurement, followed by alignment relative to the measurement. This enables the present invention to achieve higher speed alignment than is possible with most active alignment systems. As noted, the German Application does not measure positions as claimed, but instead uses an active alignment process.

For the foregoing reasons, Applicants believe that the present claimed invention is distinguishable over the applied reference. Withdrawal of the rejection is respectfully requested.

Applicants believe that the present application is in condition for allowance. A Notice of Allowance is respectfully solicited. Should any questions arise, the Examiner is encouraged to contact the undersigned.

Respectfully submitted,

By 
J. Grant Houston
Registration No.: 35,900
Tel.: 781 863 9991
Fax: 781 863 9931

Lexington, Massachusetts 02421
Date: July 6, 2004